Partitioning of hydrophobic organic chemicals between silicone polymers and LDPE

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TH052 Partitioning of hydrophobic organic chemicals between silicone polymers and LDPE D. Gilbert, Aarhus University Science and Technology Faculty / Department of Environmental Sciences; G. Witt, HAW Hamburg / Department of Environmental Engineering; F. Smedes, DELTARES / RECETOX; P. Mayer, Technical University of Denmark / Department of Environmental Engineering. Hydrophobic organic chemicals (HOCs) are widely distributed in the environment. To monitor their occurrence and fate, and to determine their toxic potential, several methods exploit HOC partitioning using polymer-based passive sampling and dosing. A wide range of polymeric materials is available, and especially different silicone materials are often preferred for HOCs offering great flexibility in application formats. Differences between polymeric partitioning phases can be determined on the basis of polymer-polymer partitioning coefficients. Simple co-exposure experiments were thus conducted with a wide range of silicone materials and one low density polyethylene. The obtained polymer-polymer partition coefficients (1) revealed differences in the partitioning of HOCs between polymers, (2) indicated the presence of fillers in some polymers, (3) indicated differences in chemical structure of some silicone polymers and (4) allowed to determine the contribution of partitioning differences between polymers to the total variability in published polymer-water partition coefficients. Finally, we present strategies on how polymer-polymer partition coefficients can be applied for correction of differences between passive sampling and dosing materials, and for the determination of polymer-specific partition coefficients.